RICHARD C. SLADE & ASSOCIATES
CONSULTING GROUNDWATER GEOLOGISTS

WORKPLAN FOR DESTRUCTION OF TWO WATER-SUPPLY WELLS AT THE BOEING REALTY CORPORATION C-6 FACILITY LOS ANGELES, CALIFORNIA

Prepared for:

The Boeing Realty Corporation
Long Beach, California

by:

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Consulting Groundwater Geologists
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RCS Job No. S9808
June 1998

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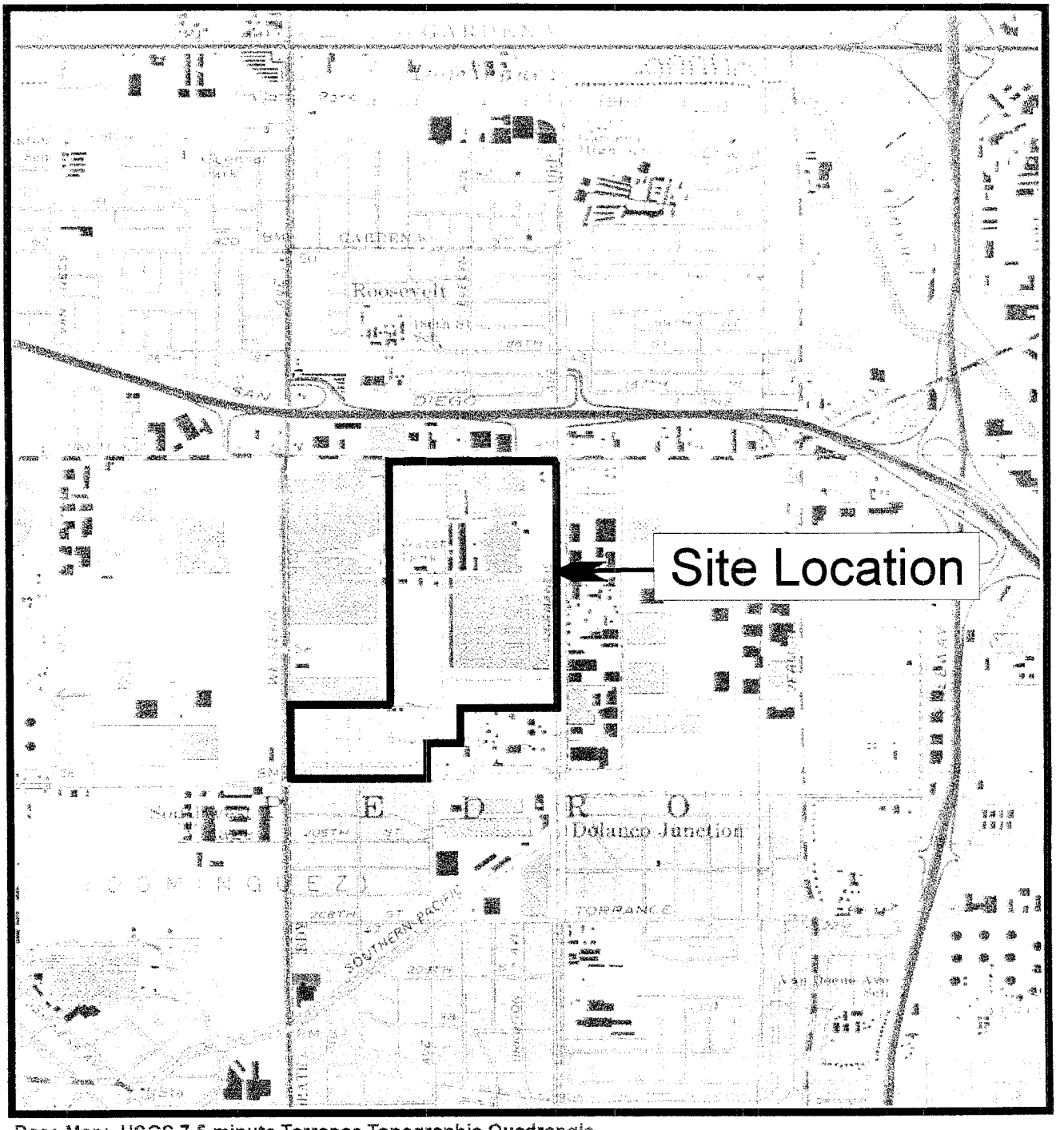
INTRODUCTION

The purpose of this Workplan is to outline proposed procedures and methods to destroy two (2) existing water-supply wells at the Boeing Realty Corporation (BRC) C-6 Facility. This facility is located on the southwest corner of the intersection of 190th Street and Normandie Avenue, in the City of Los Angeles, California. Figure 1 -Site Location Map- illustrates the location of the facility. Figure 2 -Well Location Map- illustrates the approximate location of the two water-supply wells at the facility.

All destruction procedures will be conducted in accordance with current California Department of Water Resources (DWR) guidelines and local County Ordinances. Prior to destruction, a Los Angeles County Department of Health Services (LACDHS) Well Destruction Permit will be obtained.

Beylik Drilling Company (Beylik) of La Habra, California will be the contractor to perform the actual well destruction work. Richard C. Slade & Associates, Consulting Groundwater Geologists (RCS), will be present to monitor and observe the well destruction work at certain tasks as herein specified. RCS personnel will also maintain liaison with Beylik personnel during each work task to monitor the progress of well destruction work.



Base Map: USGS 7.5-minute Torrance Topographic Quadrangle

0 2000 4000

SCALE IN FEET

N

RICHARD C. SLADE & ASSOCIATES
CONSULTING GROUNDWATER GEOLOGISTS

FIGURE 1
SITE LOCATION MAP
BOEING REALTY COMPANY C-6 FACILITY

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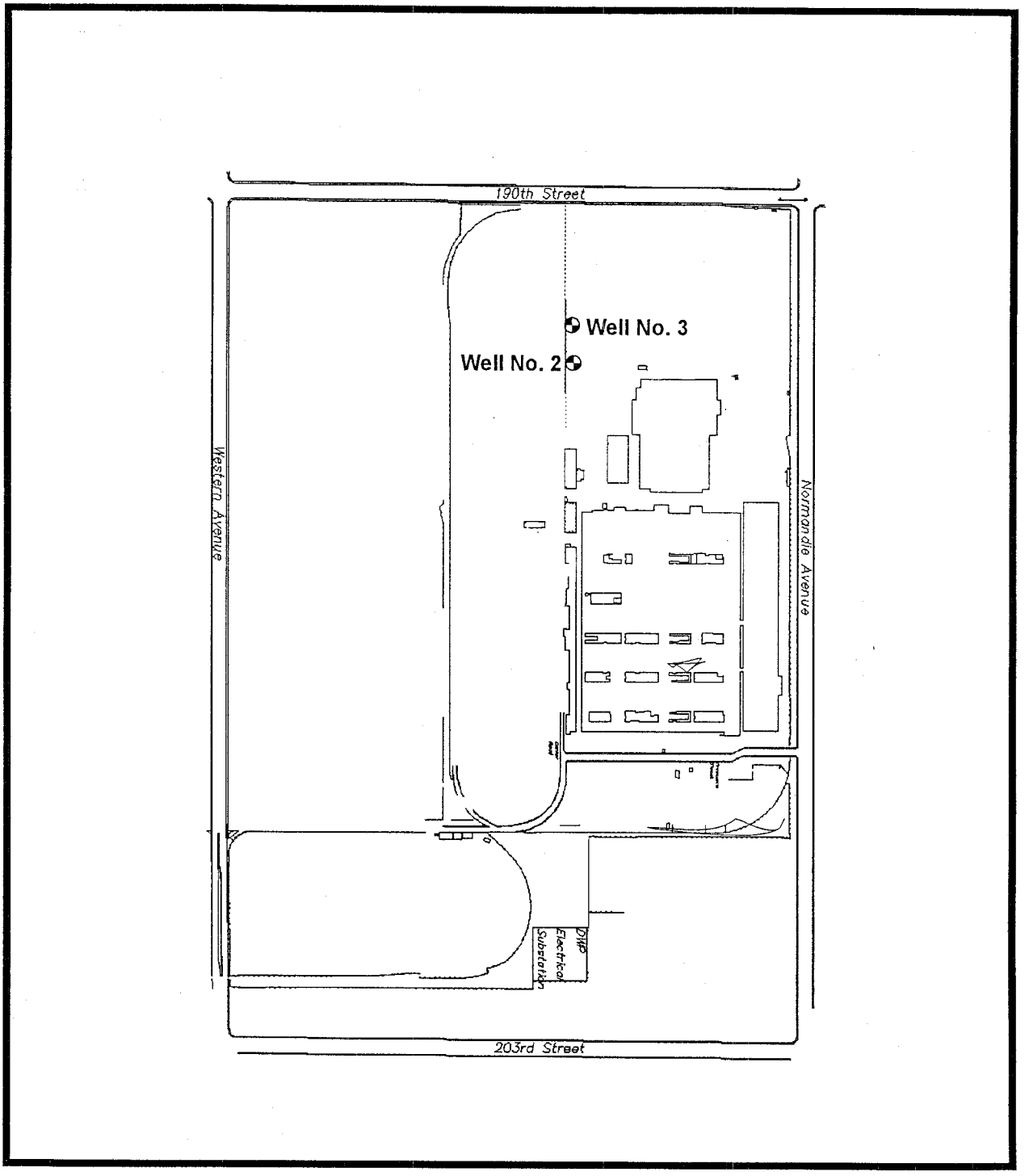

Base Map Modified from Integrated Environmental Services, Inc.

0 975 1950

SCALE IN FEET

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CONSULTING GROUNDWATER GEOLOGISTS

FIGURE 2
WELL LOCATION MAP
BOEING REALTY COMPANY C-6 FACILITY

RCS JOB NO. S9808 **JUNE 1998**

BACKGROUND INFORMATION

Available information reveal that initially three water-supply wells, Nos. 1 through 3, were installed at the subject site in the mid-1940's. According to Los Angeles County Department of Public Works, Flood Control District (LACFCD) data, the three wells are/were designated as follows:

Owner Well Number	LACFCD Number	U.S. Geological Survey Number	California Department of Water Resources Number
1	794A	T4S/R14W-1H1	T4S/R14W-1F1
2	794B	T4S/R14W-1H2	T4S/R14W-1F2
3	794C	T4S/R14W-1H3	T4S/R14W-1F3

Well No. 1 reportedly no longer exists at the site, and it is not known to this investigator when and how Well No. 1 was destroyed. The remaining two wells have not been used in many years but still have turbine pumps installed.

Original drillers' logs reveal that Well Nos. 2 and 3 were drilled for the Aluminum Corporation of America (ALCOA) between July and September 1942. The wells were drilled by the Roscoe Moss Company, most likely by the cable tool drilling method. The

following table shows the construction parameters of each well at the site, as documented in the original drillers' logs.

Well Number	Depth (ft, bgs)	Diameter of Steel Casing (inches)	Perforation Intervals (ft, bgs)
2	600	14	477-506 525-530 535-540
3	600	14	427-433 478-516 538-550

The perforations in each well are generally 5/16 inches in width and are 1-3/14 inches in length. The orientation of the slots appear to be horizontal, because the drillers' logs document a horizontal perforator was utilized in each well's construction. A copy of the original drillers' logs are presented in Appendix I of this Workplan.

WELL DESTRUCTION PROCEDURES

Pump Removal

The existing well pump components (the turbine drive head, well column, and pump bowls) in each well will be removed by Beylik Drilling Company (the contractor). Pump removal will be performed utilizing an overhead lift to vertically extract the pump components from each well.

During removal, it is anticipated that the pump column will be torch-cut at each joint. The length of each pump column interval is unknown. However, it is anticipated that the pump column will be cut at each joint in lengths of either 10 ft or 20 ft, as the pump is removed from the well. After removal from each well, all pump components will be left onsite for disposal or salvage, as deemed feasible by BRC.

After removal of the pump components, oil, if any, on the water surface will be removed by the contractor by either bailing or using an absorbent sock, as deemed necessary. An RCS geologist will be onsite near the end of pump removal in each well to observe/examine the pump column and bowls.

Water Flocculation

This is an optional task and will be performed if, during removal of the pump, initial indications deem it to be necessary. Examples of such indications may consist of excessive biological growth on pump column and/or cloudy or dirty water obtained during bailing. The flocculant will be used to remove/settle any suspended material from the water column within the well. This flocculant is very commonly used to prepare the water for video surveying of water wells.

The flocculant to be used will consist of a lime-water mixture prepared at the surface. This mixture will be poured directly down each well and allowed to settle for a few days before any additional work is performed within the casing. This product will not contaminate the groundwater.

Water Well Video Survey

Following removal of the pump and flocculation of the fluid column (if needed), a video survey will be conducted in each well. This video survey will consist of utilizing a combination vertical/sidescan color camera to examine and document, on VHS tape, the field of view of the blank and perforated casing during the vertical descent of the camera into the well. The sidescan option will be used to examine, at appropriate points and where necessary, the physical condition of the casing and/or perforations.

An onsite geologist will be present to direct the video survey, observe/examine the casing, and record those observations. Observations to be recorded by the onsite geologist in each well will include but not necessarily limited to the following items:

- Depth to water surface
- Depth and condition of casing joints.
- Physical condition of blank and perforated casing.
- Nature and extent of any encrustation/corrosion/biofouling.
- Depth interval of perforations.
- Obstructions in the well and/or possible casing ruptures.
- Amount of sediment fill in bottom of casing.

Following completion of the video survey, two copies of the video log will be obtained from the contractor. One video log will be submitted to BRC and one copy will be retained by RCS.

Bail Sediment Fill

Following the video survey, any sediment fill that has accumulated in the bottom of the well will be removed by bailing. Bailing will consist of lowering to the bottom of the well a metal bailer of adequate diameter (at least 10-inches in diameter) and equipped with a single bottom end flap to capture and lift the fill into the bailer body.

After the bailer has been lowered to the bottom of the well, the bailer will be repeatedly lowered and raised in short increments to move sediment up into the bailer. The bailer will then be brought to the surface and the contents placed into 55-gallon drums. The soil from these drums will be sampled and then samples analysed for VOCs and nitrate. This process will be repeated until the majority of sediment fill is removed from the bottom of the well. A geologist will be present onsite to examine the sediments brought up from the bottom of the well.

If any obstruction(s) are noted in the video survey to occur within each well an attempt to remove the obstruction(s) will be performed by the contractor by using the bailer if deemed feasible. However, if it is found that other methods will need to be used to remove the obstructions, then BRC personnel will be contacted and notified of the situation.

The method of removal of the obstruction will depend on the type and character of the obstruction and will be determined prior to removal. If it is found that removal of the obstruction cannot be performed, then the well will be destroyed with the obstruction in place.

Use of Casing Perforator Tool

Because the existing perforations in each well start at relatively great depths (477 ft and 427 ft in Well Nos. 2 and 3, respectively), the upper portion of the casing will be perforated with a downwell mechanical perforator tool. Additional perforations will be placed within blank casing at a depth ranging from 200 ft to 400 ft bgs, in each well. The mechanical perforator to be used will be a Mills knife perforator.

Perforations will consist of 6 to 8 cuts per row. The numbers of row to be cut in the 200-ft interval in each well to be perforated will be determined by the contractor prior to downwell perforation.

Well Grouting

The cement grout for well destruction shall be a 10.3-sack mix sand-cement grout. Cement used for the seal shall be a standard brand Portland cement conforming to ASTM C150, Type II. There shall be not more than two parts by weight of sand to one part by weight of cement. The water-cement ratio shall be about 7 gallons per sack of cement (94 pounds).

The cement grout shall be injected into the well casing from the bottom upward to a depth of approximately 50 ft bgs by means of a temporary grout tremie pipe. Cement grout materials shall be placed by a positive displacement method using pumping.

The temporary grout tremie pipe shall extend from the surface to the bottom of the well. Grout shall be placed, from bottom to top in a continuous operation. The grout pipe will be slowly raised, in incremental lengths, as the grout is placed. The discharge end of

the grout pipe must be submerged in the emplaced grout at all times until grouting is completed.

The grout will be allowed to set for a period of at least 24 hours. Following this, depth to the top of the grout will be measured. Any remaining well casing to be filled in, following settlement of the grout in the casing will be performed following well pad demolition.

Prior to grouting, a calculation of the amount of grout to be used will be performed by the contractor. The contractor will also keep a record of the volume of grout used. An RCS geologist will be present onsite to witness the grouting operation in each well.

Demolition of Well Pad

Currently, a thick cement well pad is present at each well. This well pad will be demolished by breaking. During demolition of the well pad, the soil around the casing will be excavated to a depth of approximately 6 ft bgs, and the newly exposed well casing will be cut off at that approximate depth. The rubble and debris resulting from the demolition process will be piled and left at the site to be later disposed of by BRC. The excavated soil will be used in backfilling of the well after installation of the mushroom cap.

Installation of Mushroom Cap

Following demolition of the well pad, any remaining casing volume above 50 ft bgs requiring grout will be filled in and allowed to "mushroom" by overfilling the top of the casing. This cap will be allowed to set for a minimum period of three (3) hours.

Soil Backfilling

After the mushroom cap has been allowed to set for a minimum three-hour time period, the excavated hole will be backfilled. This backfill will consist of native soil material. The backfill will then be compacted to 90% of its original compaction.

Report

Following completion of destruction operations of the two wells, a report documenting the destruction operations will be prepared and submitted to BRC. This report will include, at a minimum the following:

- The number and dimensions of pipe column and bowls removed from each well.
- A video survey report documenting downwell conditions.
- The amount of sediment bailed from each well.
- The depth and numbers (rows and columns) for perforations installed.
- The volume of cement installed in each well.
- A schematic cross-sectional diagram illustrating well destruction.

APPENDIX 1
COPIES OF ORIGINAL DRILLERS' LOGS

(DEFENSE PLANTS CORPORATION)

ROSCOE MOSS COMPANY

4360 WORTH STREET
LOS ANGELES, CAL.

WELL CONTRACTORS — RENTAL TOOLS

Log of Well No. 2 Drilled for Aluminum Co. of America
of Torrance, California.
Exact Location 190th and Normandie Sts., Los Angeles, Cal.
Started Work August 31, 1942
Completed Work September 17, 1942
Total depth 600' Size of shoe
600' ft. of 14 inch 10 inch range casing used and left in well
" " " " " " " " " " " "
" " " " " " " " " " " "
" " " " " " " " " " " "
" " " " " " " " " " " "
" " " " " " " " " " " "

Type of Perforator used Hydraulic

Perforated 540 ft. to 535 ft. 8 Holes per 4 5/16" inches
" 530 " " 525 " 8 " " 4 " "
" 506 " " 477 " 8 " " 4 " "
" " " " " " " " " " " "
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Make diagram of perforation in square, showing dimensions.

Diameter of Perforations 5/16 inches
Length of Perforations 1-3/4 "
Depth at which water was first found 67 ft.
Standing level before perforating 64 to 79 "
Standing level after perforating 83' "

Note below your observation of any change in water level while drilling

Water level when first started Test 83 ft.
Draw down from standing level "
No. of gallons per minute pumped when Test first started
No. of gallons per minute pumped when Test completed 810
Draw down at completion of Test 29 ft.

Formation: Mention size of water gravel—

0	ft. to	65	ft. Sandy clay
65	" "	157	" Sandy clay-soft streaks.
157	" "	185	" Fine sand
185	" "	212	" Blue sand and clay
212	" "	420	" Blue clay.
420	" "	428	" Fine sand to 3/8" gravel.
428	" "	434	" Blue sand and clay
434	" "	456	" Blue clay
456	" "	462	" Fine sand and clay.
462	" "	475	" Blue clay
475	" "	482	" Sand and gravel to 1".
482	" "	486	" Clay and gravel.
486	" "	504	" Sand and gravel to 2".
504	" "	522	" Sand and clay
522	" "	528	" Sand to 3/4" gravel.
528	" "	533	" Fine sand some gravel.
533	" "	538	" Sand and gravel to 3/4".

Well No. 2

Forma__: Mention size of water gravel—

0	ft. to	65	ft.	Sandy clay
65	" "	157	"	Sandy clay-soft streaks.
157	" "	185	"	Fine sand
185	" "	212	"	Blue sand and clay
212	" "	420	"	Blue clay.
420	" "	428	"	Fine sand to 3/8" gravel.
428	" "	434	"	Blue sand and clay
434	" "	456	"	Blue clay
456	" "	462	"	Fine sand and clay.
462	" "	475	"	Blue clay
475	" "	482	"	Sand and gravel to 1",
482	" "	486	"	Clay and gravel.
486	" "	504	"	Sand and gravel to 2".
504	" "	522	"	Sand and clay
522	" "	528	"	Sand to 3/4" gravel.
528	" "	533	"	Fine sand some gravel.
533	" "	538	"	Sand and gravel to 3/4".
538	" "	545	"	Sand and clay
545	" "	600	"	Sandy clay

If reducing strings of casing were cut off, state how cut

Depth from surface cut _____ ft.

Size of casing cut _____ in.

Lap in larger casing _____ ft.

Was adapter or cement used? _____

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Make drawing of adapter or in square, showing dimensions.

Is well straight, top to bottom? Practically.

If not, what is the variation? _____

Will there be any detrimental effect on pump? None

If so, what effect? _____

Give any additional data which may be of future value

Hole plugged to 596!

Driller must fill in report as work progresses and report must be complete for his successor.

Date of report September 21, 1942

W. Peterson, Driller

Type and Rig No. used No. 23

(Defense Plants Corporation)

ROSCOE MOSS COMPANY

4360 WORTH STREET
LOS ANGELES, CAL.

WELL CONTRACTORS
RENTAL TOOLS

Log of Well No. #3 Drilled for Aluminum Company of America.
of Los Angeles, Calif.
Exact Location 190th and Normandie Ave., Los Angeles, Calif
Started Work July 31, 1942
Completed Work August 29, 1942
Total depth 600 Size of shoe
600 ft. of 14 inch 10 gauge casing used and left in Well

Type of Perforator used Hydraulic

Perforated	550	ft. to	538	ft.	8	Holes per	4 inches. 5/16"
"	516	" "	478	"	8	" "	4 " "
"	433	" "	427	"	8	" "	4 " "

Make diagram of perforation in detail, showing dimensions.

Diameter of Perforations 5/16 inches
Length of Perforations 1-3/4 "
Depth at which water was first found 78 ft.
Standing level before perforating 78 "
Standing level after perforating 83 "

Note below your observation of any change in water level while drilling

Water level when first started Test 83 ft.
Draw down from standing level "
No. of gallons per minute pumped when Test first started
No. of gallons per minute pumped when Test completed 1375
Draw down at completion of Test 33 ft.

Formation: Mention size of water gravel—

0	ft. to 3	ft.	Top soil
3	" " 68	"	Clay
68	" " 118	"	Sandy clay-soft streaks
118	" " 122	"	Fine brown sand
122	" " 134	"	Brown sandy clay
134	" " 153	"	Blue clay-streaks sand.
153	" " 187	"	Fine blue sand.
187	" " 214	"	Blue sandy clay
214	" " 316	"	Blue clay
316	" " 324	"	Blue clay-1/4" embedded gravel.
324	" " 330	"	Blue clay
330	" " 333	"	Blue clay 1/4" embedded gravel.
333	" " 418	"	Blue clay
418	" " 424	"	Fine muddy sand some 1/4" to 1/2" gravel.
424	" " 432	"	Fine sand to 3/8" clay
432	" " 427	"	Fine sand and clay

Well No. 3

Formation: Mention size of water gravel—

0	ft. to	3	ft. Top soil
3	" "	68	" Clay
68	" "	118	" Sandy clay-soft streaks
118	" "	122	" Fine brown sand
122	" "	134	" Brown sandy clay
134	" "	153	" Blue clay-streaks sand.
153	" "	187	" Fine blue sand.
187	" "	214	" Blue sandy clay
214	" "	316	" Blue clay
316	" "	324	" Blue clay-1/4" embedded gravel.
324	" "	330	" Blue clay
330	" "	333	" Blue clay 1/4" embedded gravel.
333	" "	416	" Blue clay
416	" "	424	" Fine muddy sand some 1/4" to 1/2"
	" "		" gravel.
424	" "	432	" Fine sand to 3/8" clay
432	" "	437	" Fine sand and clay
437	" "	460	" Blue sandy clay
460	" "	470	" Fine sand and clay
470	" "	474	" Blue clay
474	" "	482	" Sand and gravel to 1".
482	" "	495	" Sand and gravel to 3/4"
495	" "	515	" Sand and gravel to 2".
515	" "	519	" Sand and gravel to 1/2" Muddy
519	" "	536	" Fine sand and clay.
536	" "	547	" Sand and gravel to 1".
547	" "	573	" Fine sandy clay.
573	" "	600	" Blue clay.
	" "		"
	" "		"
	" "		"
	" "		"
	" "		"

If reducing strings of casing were cut off, state how cut

Depth from surface cut _____ ft.

Size of casing cut _____ in.

Lap in larger casing _____ ft.

Was adapter or cement used? _____

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Make drawing of adapter if in concrete, showing dimensions.

Is well straight, top to bottom? Practically.

If not, what is the variation? _____

Will there be any detrimental effect on pump? None

If so, what effect? _____

Give any additional data which may be of future value

Cement Plug installed to 596'.

Driller must fill in report as work progresses and report must be complete for his successor.

Date of report September 2, 1942.

Type and Rig No. used #23

W.Peterson, Driller

SITE SAFETY PLAN
DESTRUCTION OF TWO WATER WELLS
BOEING REALTY CORPORATION C-6 FACILITY
LOS ANGELES, CALIFORNIA

INTRODUCTION

This Site Safety Plan delineates the basic safety requirements for the destruction of two existing water-supply wells at the Boeing Realty Corporation (BRC) C-6 Facility at 190th street and Normandie Avenue, Los Angeles, California. This Site Safety Plan addresses expected potential hazards that may be encountered during the destruction of the two water wells at the facility as well as mimimum worker protection requirements for RCS. The Plan will include, as a minimum, worker protection requirements for RCS personnel.

SITE SAFETY PROTOCOL

The project geologist will also be responsible for implementing the provisions of a site safety plan designed for RCS and contractor personnel at this site. A field geologist will be designated to observe and monitor contractor work activities at the site. The project geologist will be responsible for the dissemination of the information contained in this plan to all personnel assigned to the project.

The contractor on this project (Beylik) will also have its own site safety measures/plans and will be responsible for implementation of those measures with its own personnel. In addition, the contractor's site safety plan will include the requirements of the RCS Site Safety Plan. The project geologist may review the site safety measures/plan of the contractor chosen to perform the well destruction work, but this will in no way relieve Beylik of its sole responsibility for its own work, equipment, and personnel.

The project geologist will be responsible for adequately addressing the following items prior to work at the site:

- Safety supplies and equipment inventory.
- Safety and orientation meetings.
- Procedures for reporting accidents or incidents.

The project geologist will have the authority to suspend work anytime it is determined that the provisions of its site safety plan are inadequate for RCS worker safety.

Hazard Assessment

No particular airborne or other contaminants are expected to be encountered during well destruction activities at the site. However, minimum protective clothing will be mandatory for all RCS and contractor field personnel as specified in this site safety plan.

GENERAL PROJECT SAFETY REQUIREMENTS

The field geologist will monitor conditions to alert RCS field personnel to possible physical hazards. The contractor (Beylik) will have their own in-house safety protocol to also apprise and alert their personnel of potential work hazards. These hazards may include but not be limited to the following:

- Falling objects, such as tools or equipment.
- Falls from elevations.
- Tripping over hoses, pipe, tools, or equipment.
- Slipping on wet or oily surfaces.
- Insufficient or faulty protective equipment.
- Insufficient or faulty equipment or tools.

Protective Equipment Requirements

The field personnel and any visitors admitted to the general work area will be required to wear the following clothing and equipment, at a minimum, while in the work area at the project site:

a. Hard hat.
b. Safety glasses.
c. Steel-toed boots.

Field personnel engaged in work operations may be required to wear the following additional equipment at the direction of the field geologist:

a. Standard Tyvek coveralls (when required).
b. Gloves (Cloth).

Emergency Response Procedures

In the event of an accident resulting in serious physical injury, thereby requiring immediate emergency care, the appropriate local emergency response agency (through 911) will be notified. For other injuries not requiring immediate emergency care, minor first aid will be administered and the injured worker will be transported to the nearest hospital or emergency medical clinic for emergency treatment. The nearest hospital to the site is Harbor-UCLA Medical Center located approximately two (2) miles south of the facility, at the southeast corner of the intersection of Normandie Avenue and Carson Street.

In the event of fire and/or explosion local fire or other emergency response agencies (police, rescue) will be called and notified of the situation, if necessary. If property damage has occurred the requisite onsite Boeing personnel will also be notified. The identity of these personnel will be established prior to conducting any work on the site.